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Finding stability domains and escape rates in kicked Hamiltonians ARCHISHMAN RAJU, SAYAN CHOUDHURY, DAVID RUBIN, JAMES SETHNA, Cornell University — We use an effective Hamiltonian to characterize particle dynamics and find escape rates in a one dimensional system with a periodically kicked Hamiltonian. We study a model of particles in storage rings which is given by a symplectic map where the chaos is described by the KAM theorem. Ignoring the resonances, the dynamics typically has a finite region in phase space where it is stable. Photon noise in the system leads to particle loss from this stable region. Determining this 'aperture' and finding escape rates is therefore an important physical problem. We characterize the stable region in phase space using a perturbation theory developed in the context of quantum mechanics. We then derive analytical expressions for the escape rate in the small damping regime and compare them with numerical simulations. We discuss the possibility of extending the procedure to include higher dimensions and more complicated noise terms.

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